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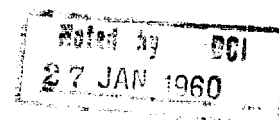
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EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF CIVIL AND DEFENSE MOBILIZATION  
WASHINGTON 25, D. C.

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OFFICE OF THE DIRECTOR

JAN 20 1960



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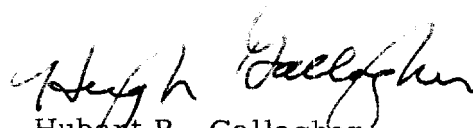
Honorable Allen W. Dulles  
Director  
Central Intelligence Agency  
Washington 25, D. C.

Dear Mr. Dulles:

Governor Hoegh asked me to send to you a copy of the  
paper he will present at the White House Conference on  
Fallout, January 25.

It is herewith enclosed.

Sincerely,

  
Hubert R. Gallagher  
Director  
Special Liaison

Enclosure

(EXECUTIVE SECRETARY FILE)

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FEASIBILITY OF FALLOUT SHELTER  
(MATERIALS, DESIGNS AND COSTS)  
STANDARDS, AND RELATION OF FALLOUT  
SHELTER TO RADIOLOGICAL DEFENSE,  
EVACUATION AND RECOVERY

LEO A. HOEGH, DIRECTOR OF OCDM

Protection from radioactive fallout is feasible.

The National Policy on Shelters which I announced for the President in 1958 states that, "In the event of nuclear attack on our country, fallout shelters offer the best single non-military defense measure for the protection of the greatest number of our people." This principle has been confirmed by a series of studies and tests, and by the National Academy of Sciences -- National Research Council. I quote from a report by the Academy:

"Adequate shielding is the only effective means of preventing radiation casualties."

"Medical prophylactic and therapeutic measures to prevent death following exposure to large doses of radiation do not presently exist. There is extremely low probability of a major break-through which would provide treatment that would give more than a very small fraction of the protection afforded by a simple shelter ....

"There is adequate technical knowledge to permit a program of construction of effective shelters ...."

The principal requirement is that there be a mass of material between the shelter occupants and the radioactive fallout. The more dense the materials, the more effective the protection. Of the dense materials, earth is, of course, the most readily available and the cheapest. An underground shelter is shielded by the earth around it. An aboveground shelter covered with earth provides good shielding. Earth banked around exposed portions of basement walls increases their protective qualities.

Other construction materials such as poured concrete; concrete block; brick; clay tile filled with sand; and steel, fiberglass-reinforced plastics, and treated wood, covered with earth, are relatively inexpensive and provide excellent shielding from fallout.

With our own engineering staff and through contracts, OCDM has developed numerous designs of home and community type shelters. The publication, "The Family Fallout Shelter," presents five designs suitable for incorporation in the home. Fifteen million copies of this bulletin have been distributed.

Designs for dual-purpose shelters in schools, garages, hospitals, apartments, and office buildings, are available now or are nearing completion. Further designs for shelters beneath streets, in dome forms, in industrial plants, and in subways are being developed. We are stimulating shelter design by the various materials manufacturers. We seek to develop the most practical and economical dual-purpose shelters for both the home and community.

The American Institute of Decorators has constructed and equipped a shelter, based on our designs, and this month displayed it at the Merchandise Mart in Chicago in connection with the wholesale furnishing show. It is booked for exhibit in the coming months in New York, Detroit, Dallas, Miami, San Francisco, and Los Angeles.

We have also given technical guidance to many individuals and firms who have developed shelter designs, some for their own use and others for inclusion in housing developments, or for general sale.

Adequate fallout shelter can be constructed at from \$25 to \$150 per person. The lowest figure \$25, applies to "do-it-yourself" family shelters in basements.

Where separate independent structures are required for fallout shelter, the cost may run \$150 per person or more. The cost for most shelters will fall between these two extremes. Cost tends to be lower when the shelter can be incorporated in new buildings at the time of design.

What standards are required?

In planning for fallout protection, it is necessary to consider the degree of fallout contamination which may occur, the radiation dose which can be accepted for humans, and the type of shelter required.

OCDM has undertaken to review and accept plans for fallout shelters which may vary from those included in our official publications. We encourage contractors and builders to specify the degree of protection afforded.

This chart indicates the intensity of fallout contamination which might spread across Iowa after a 10-megaton surface nuclear detonation on Offutt Air Force Base near Omaha. The assumed weapon design is fifty percent fission--fifty percent fusion; and the spread of fallout is based upon average summer weather conditions.

When a 10-megaton nuclear weapon is detonated at or near the surface of the earth, an area of blast and fire devastation spreads out to about ten miles from ground zero during the first minute after detonation. This is shown by the cross-hatched area on the chart and represents almost 450 square miles. During the subsequent 18 hours over 5,000 square miles would be seriously contaminated by fallout as shown by the colored shading. Six hours after the detonation, fallout would have spread 130 miles to Des Moines, and after 18 hours, about 300 miles to the Davenport-Rock Island area.

Without fallout protection, virtually all people in the red and blue shaded areas would die during the first three or four weeks, and most of those people in the yellow and inner green shaded areas would suffer serious radiation sickness which might incapacitate them for periods of weeks to months. For example, the cumulative outside radiation dose during the first two weeks at Atlantic might be as high as 20,000 R. At Des Moines, it would be about 2,000 R; at Grinnell, 400 R; at Iowa City, 200 R; and at Davenport-Rock Island, 100 R.

Medical advice to OCDM is that an individual can continue to work efficiently if the total radiation dose, spread over a few days, does not exceed 200 R. A dose of more than 200 R within the period of a few days, probably will cause radiation sickness.

Time is a factor in measuring the effects of a radiation dose. The body repairs some of the radiation damage. Thus, an individual can absorb a given dose over a period of weeks without being incapacitated, although the same dose absorbed in a few days could cause serious illness.

In wartime, an individual required to risk radiation hazards might be able to take as much as 900 R in a year without being incapacitated. It would be necessary, of course, to make certain that the radiation dose was spread out more or less evenly over the full 12 months.

To keep radiation exposure below 200 R, the home itself would provide sufficient protection in much of this fallout area. In this illustration, fallout shielding afforded by the first floor of an average home would be sufficient 200 miles from the point of explosion. This degree of shelter, as indicated on the right side of the drawing, will reduce the radiation exposure to one-half of that which exists in open area around the home. At Davenport-Rock Island, the cumulative dose to people who remained on the first floor of their homes for the first two weeks would be about 50 Roentgens. In Iowa City, the dose would be 100 R on the first floor, during the first two weeks.

At about 130 to 200 miles from ground zero in this example, the corner of a home basement should provide sufficient protection to prevent radiation sickness. As indicated in the center of the drawing, this degree of shelter will reduce the radiation exposure up to one-twentieth. If the people at Grinnell remained in the corners of their basements during the two-week interval, their radiation exposure would total approximately 20 R. In Des Moines, the two-week exposure under these conditions would be 100 R.

However, better fallout protection is required out to approximately 130 miles from ground zero. In this zone, the visual shows our "do-it-yourself" basement concrete block shelter which costs between \$150 and \$200. This shelter, which can reduce radiation exposure to about 1/200th, would provide adequate fallout protection in most of the nation. At Atlantic, people who remained in basement concrete block shelters would be exposed to a radiation dose of about 100 R during the first two weeks. It should be noted that in all of these cases, the cumulative dose has been kept to, or below, 200 R.

In the event of a nuclear war, there will be many surface detonations in the United States. The fallout patterns will overlap one another and be far more complicated than this simplified pattern. This overlap of fallout will cause greater radiation intensities than indicated on this visual. There will be areas where homes and home basements will provide adequate fallout protection. However, there is no way of predicting where these areas will be. Consequently, we cannot advise that the first floor or basement of a home in any specific area will provide adequate protection. Rather, all families must be encouraged to provide themselves with the fallout protection recommended in our family fallout shelter manual. With this standard, all of our people who survive the initial blast and thermal effects could survive the effects of fallout in a nuclear war.

The success of a program of fallout protection would be dependent upon other emergency services and, in particular, upon the effectiveness of radiological monitoring and upon adequate communications.

OCDM's National Warning System can transmit warnings to over 300 key points in every State within 90 seconds. From these points, other networks and systems spread the public warnings and action signals so that almost all areas are alerted in minutes. Our warning officers are on duty twenty-four hours every day at North American Air Defense Headquarters, side by side with the military warning officers, and with simultaneous access to warning information.

We are strengthening this system, adding other points to the primary warning system. Our ultimate objective is to have such an effective warning system that all people will receive notice of an attack simultaneously.

OCDM provides funds for all equipment necessary to establish the warning points in this National Warning System (NAWAS). These points are manned by State and local personnel. To encourage the extension of direct warning capability, OCDM also provides funds to the States and cities on a 50-50 basis for NAWAS extensions. New York State now has one NAWAS extension in each county.

Sirens and other warning devices to reach the public are paid for with fifty percent Federal funds and fifty percent State and local funds. 129 principal cities in the United States now have adequate siren coverage but it must be remembered that sirens primarily warn people who are out of doors.

Considerable research has been conducted to develop an efficient and economical indoor warning device. A promising development is the National Emergency Alarm Repeater System (NEAR) which is in the final test stages. This system utilizes power lines to provide a means of direct warning to individual homes and other buildings. Today, warning time of 2 to 3 hours is regarded as probable. With the development of missiles, tactical warning may be reduced to 15 to 30 minutes. This reduction in warning time requires us to develop the maximum of direct warning capability and to keep the need for relay of information to a minimum.

Standard AM radio, controlled under CONELRAD, would be used as an adjunct to the warning system both before and after an attack. It will be particularly valuable in warning the population of expected fallout, and for advising people when they can leave their shelters.

We have a command communications network which is ready for operational call-up at any time. It connects our headquarters with the Regional Offices and the States. This system shortly will be on a full-time basis, and during the next year will have a radio backup. Within the States great reliance is placed on police and other public radio and land lines networks. Many State systems have been improved with fifty percent matching funds, made available under the OCDM Financial Assistance Program. Communications with the public will be primarily by Radio.

A national radiological monitoring capability is being developed to warn the public rapidly of danger from fallout and to furnish post-attack radiation information upon which Federal, State and local governments can base protective and recovery actions.

A network of approximately 150 thousand fixed monitoring stations is being established across the country. Approximately six thousand of these stations will be at Federal locations, manned by Federal employees. The remaining 144 thousand will be at State, county, and local facilities. Today, approximately 15 thousand of these stations are in operation. The total network of 150 thousand stations is scheduled for completion by the end of calendar year 1963. The Office of Civil and Defense Mobilization provides the monitoring instruments required at these stations. They are operated by regular Government employees.

OCDM and AEC have been striving to perfect a simple, effective, and inexpensive home monitoring device to detect and measure fallout radiation. Such instruments can be used to select the safest areas in home or shelter, to estimate how long a family should expect to remain in shelter, and when it is safe to leave.

OCDM announced last fall a significant advance toward reasonably priced radiation instruments for the citizen. One company has offered a package of two instruments and a charger at a retail price of \$20, which can be used to measure (1) dose rates over a range from less than 1 roentgen per hour to more than 100 roentgens per hour, and (2) radiation doses up to 600 roentgens. OCDM is buying an initial quantity of 100 sets of these instruments, furnishing each State one set. Another company has indicated that it plans to offer instruments in the same price range at a later date.

OCDM research to improve instruments and reduce costs is continuing. Once a suitable instrument is developed, we plan to study various methods of packaging, distributing, and marketing. Any device recommended for public purchase must be reliable, accurate, and simple. Current research is expected to be completed this summer. At that time, one or more of the instruments under consideration may be officially endorsed.

We continue to utilize results of AEC research in the instrument field. Recent prototype developments under AEC sponsorship include (1) a geiger counter combined with a radio, and (2) another device in which warning of radiation is given by a siren-like noise produced through use of a cadmium sulfide crystal detector in a radio. It is hoped that added cost in the first would be no more than \$20 and in the second about \$10.

Citizens instruments will not replace the standard radiological survey meters designated for operational use.

Neither will the widespread use of such an instrument reduce the need for trained CD monitors. Instead they supplement national radiological defense.

The National Policy on Evacuation is one which is constantly misunderstood or misrepresented. The National Plan outlines the policy briefly and specifically. It states:

"Governments and the public will take such action on receipt of warning as is prescribed by the Government involved."

(1) "Evacuation or Dispersal -- target cities and other areas near assumed targets will, if time and conditions permit, execute plans for evacuation or dispersal to prepared reception areas.

(2) "Shelter -- if time and conditions do not permit evacuation, full advantage will be taken of existing shelter, and fallout protection will be improvised."

(3) "The action to be taken is a local decision."

State and local governments under their Federally financed survival plans have established evacuation plans based upon the time and conditions which would permit evacuation of a given area. All States, 240 target areas and 2200 counties have developed survival plans.

We emphasize that evacuation is one principal tactic. We must be ready to execute movement plans either before or after an attack -- if conditions dictate such action. This policy of evacuation is tied closely to a policy of shelter but neither tactic should be developed to the exclusion of the other.

This is the same tactic which is so basic to military operations under conditions of nuclear war. If people are within the "A" ring of a nuclear explosion, their chances are slim. These chances are substantially increased if they are able to move even relatively short distances after tactical warning. We would be derelict in our duty if we were not prepared to execute such moves when warning time permits.



We are placing great emphasis on the construction of family fallout shelter. Evacuation plans should emphasize movement home to these shelters wherever possible. Sometimes it could be desirable to evacuate an area of intense radiation after an attack.

All of these programs -- warning, communications, radiological monitoring and movement -- together with other measures for civil defense and defense mobilization -- have the purpose, as stated in the preface to the National Plan for Civil Defense and Defense Mobilization, to "deter aggression, and in the event of aggression to enable the nation to survive, recover and win." Full-scale recovery efforts cannot begin until the fallout radioactivity rate drops to levels safe enough to permit emergency crews to spend limited times in the open.

In areas of heavy fallout that would be about two weeks -- it would be necessary for everyone to remain sheltered that long. That means every individual family would have to subsist on its own with what it had on hand at the time of attack.

Government action during this period would be limited largely to "Disaster Services." These include fire-fighting, rescue, monitoring radiation, and limited emergency feeding.

Later, as crews were able to spend more time in the open, the city, State, and Federal Governments would be able to help in recovery efforts, emergency feeding and other essential services.

We cannot say too bluntly that in the first two weeks after attack every individual family and every city and State government is likely to be on its own.

Our economic system depends upon a constant flow of goods and services across the nation. A city or even a State isolated by a nuclear attack would be able to meet the basic needs of its people for but a limited time.

As these communities cannot depend upon help from outside, the National Plan calls for States and cities to make preparations to survive without help for at least four weeks after attack. After that period, States could call upon the Federal Government.

OCDM's overall responsibility for resources management would be carried out by using the capabilities of the entire Federal Government, according to plan. The Department of Agriculture has been given responsibility for food, Interior for fuel and energy, Labor for manpower.

These and other resource areas are covered in the National Plan and its Annexes, which have been developed with the cooperation of State and local directors as well as the other Federal agencies.

Such problems of recovery are in many ways more complex than those of more immediate survival. Both require much advance preparation.

Announced on May 7, 1958, the National Shelter Policy has met with reasonable public acceptance. The extent of public interest, as evidenced by letters and inquiries regarding plans, is encouraging, despite delay in obtaining appropriations to speed the action elements of the policy.

The Federal role has included the following action elements:

1. Education, with emphasis on facts about fallout and steps which can be taken to minimize its effects;
2. Survey of existing shelter, on a sampling basis, to demonstrate the value of existing structures in providing fallout protection;
3. Research, to show how fallout shelters can be incorporated in existing, as well as new buildings;
4. Prototype design and construction -- a program of both research and demonstration;
5. Leadership and example, by incorporating fallout shelters in appropriate new buildings; and
6. Incorporation of shelters in existing Federal buildings (not yet funded).

I have touched on these points but want to reiterate the important measures taken in the field of Federal leadership. Here, we must eliminate every barrier and do everything possible, by example, to give evidence that the Government realizes the seriousness of the problem. These are recent measures involving Federal loan or grants-in-aid programs:

1. The 1961 budget will include funds for incorporation of fallout shelters in all new civilian Federal structures determined to be suitable. \$11 1/2 million has been requested.
2. The Federal Housing Administration and the Veterans Administration have announced that fallout shelters will be eligible items in determining valuation for loans or loan insurance. In addition, FHA, home-improvement loans are available to finance building of fallout shelter in existing structures.
3. The Housing and Home Finance Agency and the Community Facilities Administration have announced that fallout shelters may be included in projects qualifying for Federal loans and advances under its College Housing Program, its Public Facilities Loan Program, and its Project Planning Program.
4. The Department of Health, Education and Welfare and the Public Health Service have announced that grants for hospital construction under the Hill-Burton Act will be eligible for incorporation of fallout shelters.
5. The HHFA and the Urban Renewal Administration will make "Master Planning" grants to local authorities available for planning the incorporation of fallout shelters in urban redevelopment projects. In addition, local authorities may include fallout shelters in site development improvements and receive full credit toward the local share of the project.
6. The Public Housing Administration is studying the possibility of ruling that fallout shelters may be included in new low-rent public housing projects upon application of local authorities.

Survival, recovery and victory -- these are our goals if war comes.

I have made here three major points. They are:

First, fallout protection is feasible. We know the designs, the materials and the cost.

Second, the standards of fallout protection are reasonable.

And Third, fallout shelter has a sensible and direct relationship to overall radiological defense, evacuation and recovery.

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MEMORANDUM FOR: [REDACTED]

We do not find any conflict between  
this speech and the material provided to the  
Director.

ER -


*CEC*



22 January 1960  
(DATE)

FORM NO. 101 REPLACES FORM 10-101  
1 AUG 54 WHICH MAY BE USED.

(47)

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TO	NAME AND ADDRESS	INITIALS	DATE
1	Dr. Otto Guthe		
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<b>ACTION</b>		<b>DIRECT REPLY</b>	<b>PREPARE REPLY</b>
<b>APPROVAL</b>		<b>DISPATCH</b>	<b>RECOMMENDATION</b>
<b>COMMENT</b>		<b>FILE</b>	<b>RETURN</b>
<b>CONCURRENCE</b>		<b>INFORMATION</b>	<b>SIGNATURE</b>

**Remarks:**

Otto:

Herewith is the paper I mentioned to you that we have just received from Leo Hoegh. I have talked to [redacted] who will have his people beef up the OCI aspects of the paper the DCI is to present Monday, and they will get in touch with you for your contribution which, as I indicated, will have to be slightly boiled down. I would appreciate it if you could see that Mr. Hoegh's paper is gotten back up here to us tomorrow morning in case the DCI wants to look it over during the weekend.

**FOLD HERE TO RETURN TO SENDER**

**FROM: NAME, ADDRESS AND PHONE NO.**

**DATE**

Asst to the Director

1/22/60

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